



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 694 098 A2**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:

**23.08.2006 Bulletin 2006/34**

(51) Int Cl.:

**H05B 6/68 (2006.01)**

(21) Application number: **06250938.5**

(22) Date of filing: **22.02.2006**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI  
SK TR**

Designated Extension States:

**AL BA HR MK YU**

(72) Inventor: **Hollingsworth, Philip  
Warrington, WA4 2LP (GB)**

(74) Representative: **Brown, George Laurence  
Urquhart-Dykes & Lord LLP  
Tower North Central  
Merrion Way  
Leeds LS2 8PA (GB)**

(30) Priority: **22.02.2005 GB 0503614**

(71) Applicant: **Glen Dimplex Home  
Appliances Limited  
Merseyside, L35 2XW (GB)**

### (54) Oven control and method of controlling an oven

(57) An oven control comprising input means and a processor for controlling at least first and second oven functions in response to an input signal from the input means is described. The processor is adapted to activate the second oven function in response to user input from the input means whilst the first oven function is in operation. The activation of the second oven function may be conditional on a check that the oven will still be within predetermined operating requirements. This allows a user fine control over any combination of oven features at any point in cooking. A corresponding method is also described.

An oven control comprising a plurality of buttons for selecting at least two oven functions, a plurality of indicia associated with the plurality of buttons for indicating whether an oven function can be selected, and a processor for controlling the display of selected ones of the plurality of indicia is also described. The processor is adapted to display indicia of an oven function which can be selected in a first indication state and to display indicia of an oven function which is activated in a second indication state. The different indication states may be different colours.

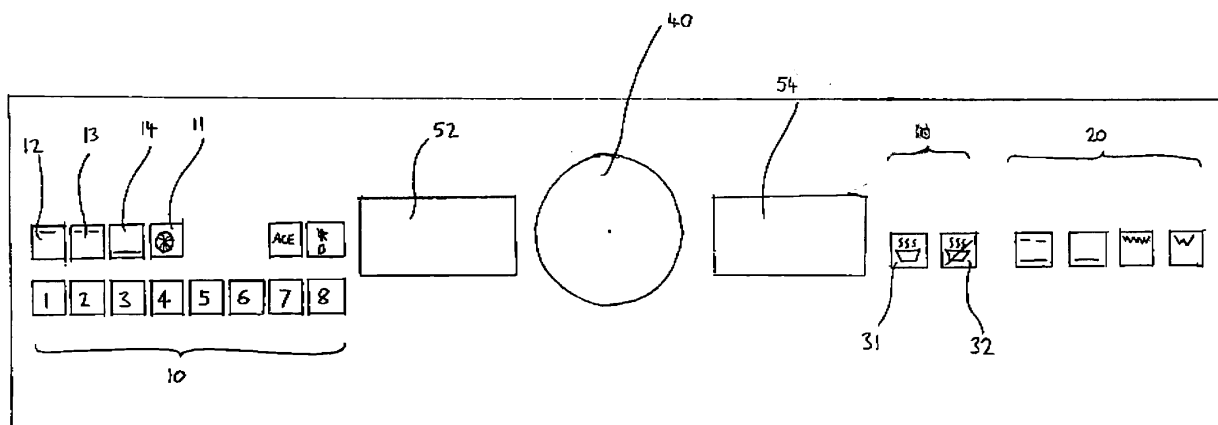


Fig. 1

EP 1 694 098 A2

**Description**

**[0001]** The present invention relates to a control for an oven and a method of controlling an oven.

**[0002]** Ovens which can provide a variety of functions within a single cooking volume, such as fan oven, convection oven and grill are known. The various modes are conventionally selected using a rotary switch.

**[0003]** However, a rotary switch only allows selection of particular oven functions which correspond to a particular position of the rotary switch.

**[0004]** The present invention provides a control and a method of controlling an oven which allows any combination of oven function to be selected by a user at any point in operation of the oven. The present invention also provides a method of controlling an oven which provides indication to a user to indicate functions which are available for selection or which have been selected.

**[0005]** According to a first aspect of the present invention, there is provided an oven control comprising input means; and

a processor for controlling at least first and second oven functions in response to an input signal from the input means; wherein the processor is adapted to activate the second oven function in response to user input from the input means whilst the first oven function is in operation.

**[0006]** A user can therefore exercise a high degree of control over the oven at all stages in the cooking process. The user can choose to activate an additional oven function at any time in the cooking process and is not limited to preselected combinations chosen by the manufacturer at the time of manufacture. For example, the user can choose to activate a grill element to give additional browning without needing to alter the existing cooking settings, such as the temperature of a fan oven. With a conventional rotary switch, it is not possible to select a grill element without first turning off the fan oven. Likewise, in other ovens, such as combination microwave ovens, it is not possible to select an additional oven feature, for example a grill element, during cooking without first cancelling existing cooking settings.

**[0007]** In one embodiment, the input means may comprise a plurality of buttons. The term "button" is intended to include all means of selection in which an item is pressed by a user. It therefore includes push buttons and also touch sensitive panels where a user may press a section of the panel.

**[0008]** Preferably, the processor is further adapted to determine the combined operating requirement of the first and second oven functions and, if the combined operating requirement of the first and second oven functions is more than a predetermined limit, to reduce the operating requirement of the first oven function before activating the second oven function to ensure that the predetermined limit is not exceeded.

**[0009]** Any installation of an oven will be subject to constraints on its operating requirements. The operating requirements define constraints on the oven's operation, for example the maximum power (in watts) or current (in amps) which can be drawn from the power supply. It is possible that a user may select a combination of features which will exceed that permitted, possibly resulting in damage to the oven or power supply. By calculating the combined requirement before activating the second selected function, and reducing the requirement of the first function if necessary, the processor can prevent the oven from exceeding predetermined limits. This improves the safety of the oven and allows the user freedom to select any combination of oven functions. Existing ovens with rotary switches circumvent this issue by only allowing a single oven function to be selected at one time.

**[0010]** According to a second aspect of the present invention, there is provided a method of controlling an oven, the method comprising:

activating a first oven function in response to user input;

receiving user input, whilst the first oven function is in operation, of a second oven function to be operative together with the first oven function; and

activating the second oven function.

**[0011]** This allows the user freedom to add additional functions at any time in the cooking process.

**[0012]** Preferably, the method further comprises, before the step of activating the second oven function:

determining the combined operating requirement of the first and second oven functions; and

if the combined operating requirement of the first and second oven functions are more than a predetermined limit, reducing the operating requirement of the first oven function before activating the second oven function to ensure that the predetermined limit is not exceeded.

**[0013]** An additional oven function can therefore be added without danger of exceeding the permitted maximum operating requirements.

**[0014]** According to a third aspect of the present invention, there is provided an oven control comprising:

a plurality of buttons for selecting at least two oven functions;  
 a plurality of indicia associated with the plurality of buttons for indicating whether an oven function can be selected; and  
 a processor for controlling the display of selected ones of the plurality of indicia,

wherein the processor is adapted to display indicia of an oven function which can be selected in a first indication state and to display indicia of an oven function which is activated in a second indication state.

**[0015]** By using the first and second indication state, the control can easily guide a user in which functions are available for selection or have been selected. The use of "buttons" is intended to include all means of selection which can be pressed, including push buttons and touch sensitive panels.

**[0016]** In one embodiment the indicia are incorporated into the buttons themselves. This embodiment is particularly suitable for touch sensitive panels.

**[0017]** Preferably, the processor is further adapted to determine whether further user input is required before the selected oven function can be activated and, if it is determined that further user input is required, to display indicia of the further user input required in a third indication state.

**[0018]** In this way the processor can guide a user to enter the correct information. For example if a user selects the convection oven function, the processor can indicate to the user that a temperature is required to be input.

**[0019]** According to a fourth aspect of the invention, there is provided a method of controlling an oven, the method comprising:

displaying a plurality of indicia corresponding to at least two oven functions which can be selected in a first indication state;

receiving a user input of a selected oven function;

activating the selected oven function;

displaying indicia of the selected oven function in a second indication state; and

displaying indicia of oven functions which can be activated together with the selected oven function in said first indication state.

**[0020]** Preferably, said step of activating the selected oven function further comprises:

determining whether further user input is required before the selected oven function can be activated and, if it is determined that further user input is required, displaying indicia of the further user input in a third indication state.

**[0021]** The method can therefore guide a user in operation of the oven by the use of different indication states.

**[0022]** In the above third and fourth aspects, the first, second and third indication states are preferably different colours. Alternatively the first and second indication states may be different colours with the third indication state being flashing of the indicia.

**[0023]** The oven control of the first and third aspects may be combined into a single control. Likewise the methods of the second and fourth aspects may also be combined.

**[0024]** Embodiments of the invention will now be described by way of example only with reference to the accompanying drawing.

**[0025]** Figure 1 depicts the surface layout of a control according a first embodiment of the invention. The control is for controlling a dual oven with a main oven and a top oven. A first button cluster 10 is provided on the left hand side to control the main oven and a second button cluster is provided on the right hand side to control the top oven. A third button cluster 30 provides control to set the oven timer. Finally, a central rotary press switch 40 is provided in the centre of the control.

**[0026]** Either side of rotary press switch 40 are windows 52, 54 for displaying information such as cooking temperature and cooking time. In this embodiment each window covers four seven-segment numerical LED indicators.

**[0027]** Button clusters 10, 20, 30 are all of the touch sensitive type. A light, an LED in this embodiment, is located behind each button. As can be seen from Figure 1, the majority of the control is coloured black, indicating that light cannot be transmitted through it. Each of the buttons incorporates a clear section forming an indicia of its purpose. The LED can shine through the clear section illuminating the button. The LEDs are of the type which can emit a different colour of light depending on the applied voltage. LEDs which can emit both red and green light are preferred.

**[0028]** The control further comprises a processor (not illustrated) which is connected to the button clusters 10, 20, 30, the central rotary switch 50 and the LEDs behind the buttons and clear windows 52, 54. The processor can control the LEDs to be on or off, to be a particular colour and, for the LEDs behind the clear windows 52, 54, to display particular numerical information. The processor may be implemented by a microprocessor, Application Specific Integrated Circuit, Field Programmable Gate Array, or any other suitable electronic device.

**[0029]** The processor is used to control the oven functions in response to user input on the control. The operation of

the control will now be described.

**[0030]** In order to turn the oven on or off, a user presses the central rotary press switch 40. The processor then activates the buttons in clusters 10 and 20 to indicate oven functions that can be selected. A red light is used to indicate functions which can be selected.

**[0031]** The user then selects a particular function by pressing the relevant button. For example the user may press button 11 which indicates that the main oven is required to function as a fan oven. The processor receives the user input and changes the colour of button 11 to green to indicate that the function has been selected. It is then determined whether further user input is required. In this case, input of the temperature of the oven is required. The microprocessor then displays a flashing red temperature in window 52. This functions as a prompt to the user to rotate the rotary press switch 40 to set the desired temperature.

**[0032]** When the rotary press switch 40 is rotated the processor monitors the period between input signals received from it. In the event that no further input signal is received after a predetermined period, for example 3 seconds, the processor determines that the correct temperature has been selected. The temperature thus chosen is then displayed in window 52 in solid green (not flashing) to show it has been selected.

**[0033]** Now that the fan oven function is operational, the processor displays in red additional oven functions which can be set in addition to the fan oven. For example the processor may light buttons 12, 13, and 14 which indicate additional heating elements within the main oven which the user can choose to activate if required. The processor also displays button 31, which is to set the timer, in red.

**[0034]** If the processor determines that button 31 has been pressed it displays a flashing time period in red in the right hand window 54. The user can then rotate the rotary press switch 40 to select the desired time. As mentioned above, the processor determines that the correct time has been set when there is no input from the rotary press switch 40 for a predetermined period, for example 3 seconds. The time in the second window 54 is then stopped from flashing and turned green to indicate that it has been set. Button 31 is also shown in green. As the set time elapses, the processor changes the displayed time in window 54 to indicate the remaining cooking time.

**[0035]** When a cooking time has been set the processor then displays button 32 in red. This button is used to set a desired time when cooking should be complete. When a user presses button 32, an end time is displayed in red in window 54. Once again the user can use rotary press switch 40 to enter a desired ending time. When the ending time has been entered the processor displays button 32 in green. The processor also calculates the correct starting time by subtracting the cooking time from the ending time. The oven is then turned on at the starting time so that the food is ready at the required ending time.

**[0036]** If the processor determines that one of buttons 12, 13 or 14 has been pressed, it first checks what the combined operating requirements (for example power consumption or current requirement) of the currently active oven function in combination with the newly selected oven function is. This is compared to predetermined limits, for example 3kW or 13 Amps. If the operating requirement is higher than the limit, the processor reduces the power or current supplied to the currently active oven function (in this case the fan oven) before it activates the newly selected function to ensure that the oven does not exceed the limit.

**[0037]** This checking of operating requirements is also applied to selection of oven functions in the top oven from button cluster 20 both when the top oven only is in use and when both the main oven and top oven are in use. This is especially useful when the top and main ovens share a common power supply.

**[0038]** In alternative embodiments, other forms of display may be used instead of LEDs. For example Liquid Crystal or florescent displays.

**[0039]** In further alternative embodiments, other colours and indication states may be used to indicate selected or selectable oven functions, and required information.

## Claims

1. An oven control comprising  
input means; and  
a processor for controlling at least first and second oven functions in response to an input signal from the input means; wherein the processor is adapted to activate the second oven function in response to user input from the input means whilst the first oven function is in operation.
2. An oven control according to claim 1, wherein the processor is further adapted to determine the combined operating requirement of the first and second oven functions and, if the combined operating requirement of the first and second oven functions is more than a predetermined limit, to reduce the operating requirement of the first oven function before activating the second oven function to ensure that the predetermined limit is not exceeded.

3. A method of controlling an oven, the method comprising:

activating a first oven function in response to user input;  
receiving user input, whilst the first oven function is in operation, of a second oven function to be operative  
together with the first oven function; and  
activating the second oven function.

4. A method according to claim 3, further comprising, before said step of activating the second oven function:

determining the combined operating requirement of the first and second oven functions; and  
if the combined operating requirement of the first and second oven functions are more than a predetermined  
limit, reducing the operating requirement of the first oven function before activating the second oven function  
to ensure that the predetermined limit is not exceeded.

5. An oven control according to claim 2 or a method according to claim 4, wherein the operating requirement is the  
current drawn from a power supply, and the predetermined limit is expressed in amps.

6. An oven control according to claim 2 or a method according to claim 4, wherein the operating requirement is the  
power drawn from a power supply, and the predetermined limit is expressed in watts.

7. An oven control, the control comprising:

a plurality of buttons for selecting at least two oven functions;  
a plurality of indicia associated with the plurality of buttons for indicating whether an oven function can be  
selected; and  
a processor for controlling the display of selected ones of the plurality of indicia,

wherein the processor is adapted to display indicia of an oven function which can be selected in a first indication  
state and to display indicia of an oven function which is activated in a second indication state.

8. An oven control according to claim 7, wherein the processor is further adapted to determine whether further user  
input is required before the selected oven function can be activated and, if it is determined that further user input is  
required, to display indicia of the further user input required in a third indication state.

9. A method of controlling an oven, the method comprising:

displaying a plurality of indicia corresponding to at least two oven functions which can be selected in a first  
indication state;  
receiving a user input of a selected oven function;  
activating the selected oven function;  
displaying indicia of the selected oven function in a second indication state; and  
displaying indicia of oven functions which can be activated together with the selected oven function in said first  
indication state.

10. A method according to claim 8, wherein said step of activating the selected oven function further comprises:

determining whether further user input is required before the selected oven function can be activated and, if it  
is determined that further user input is required, displaying indicia of the further user input in a third indication state.

11. An oven control or a method according to any one of claims 7 to 10, wherein the first, second and third indication  
states are different colours.

12. An oven control or a method according to any one of claims 7 to 11, wherein the third indication state comprises  
flashing the indicia.

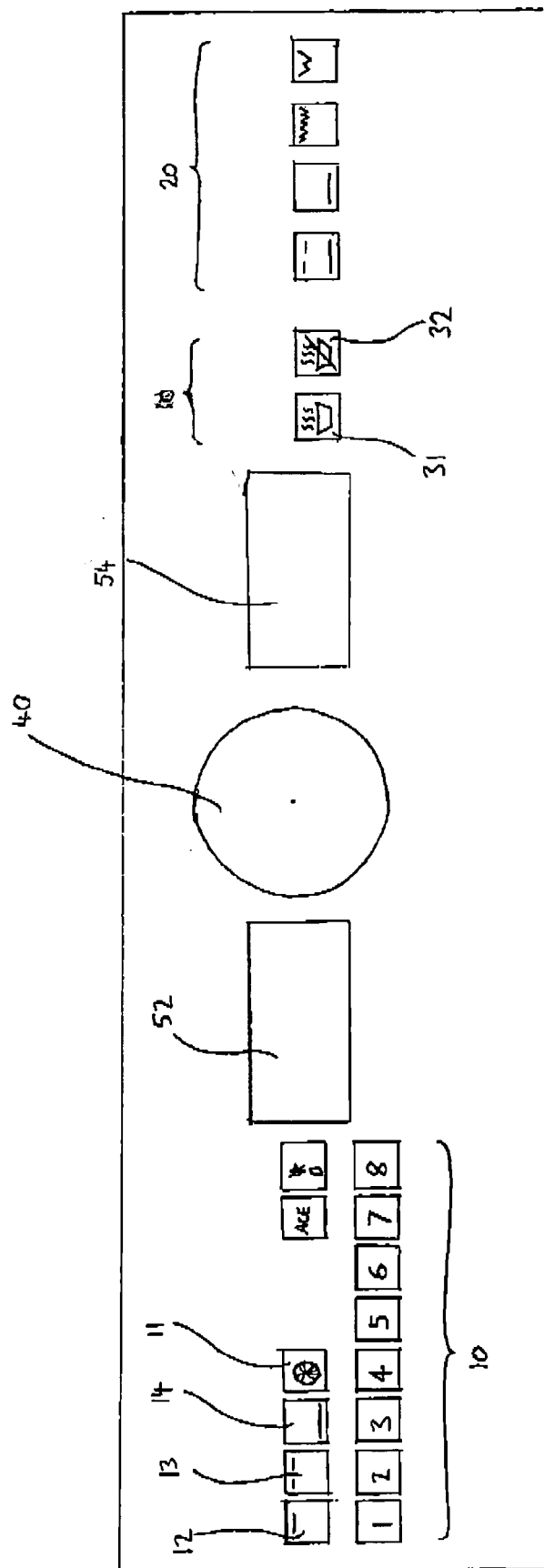


Fig. 1